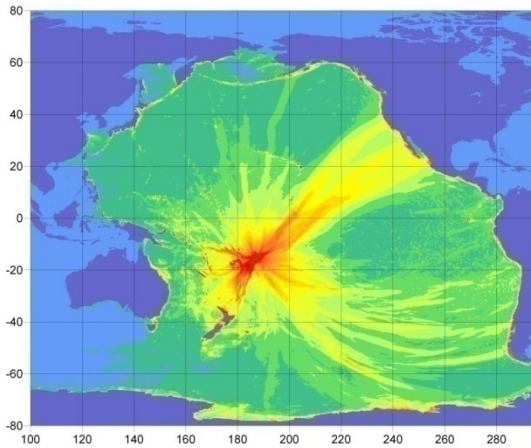
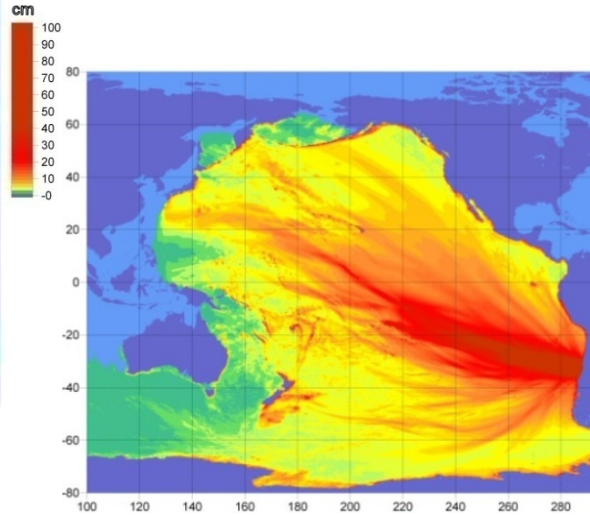


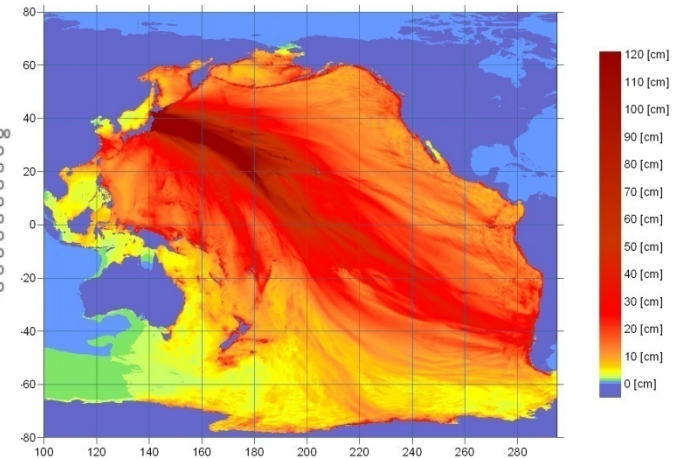
Tsunami Evacuation Playbooks and Maritime Products for Los Angeles Co.



2009 Samoa



2010 Chile



2011 Japan

Rick Wilson, California Geological Survey

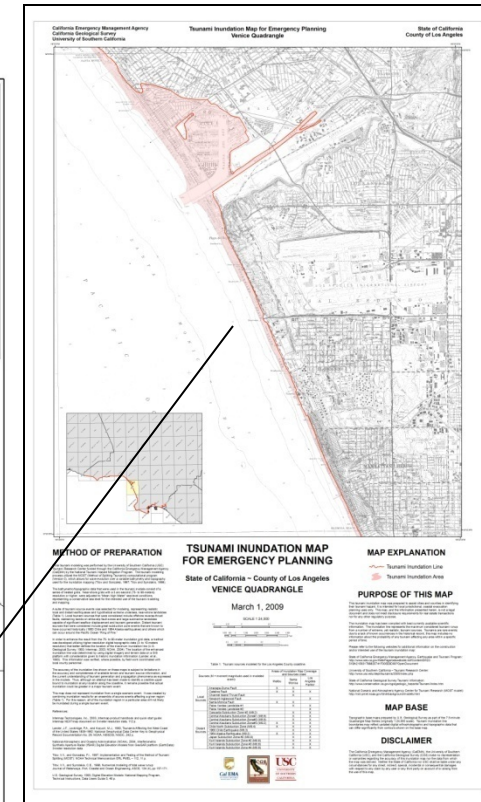
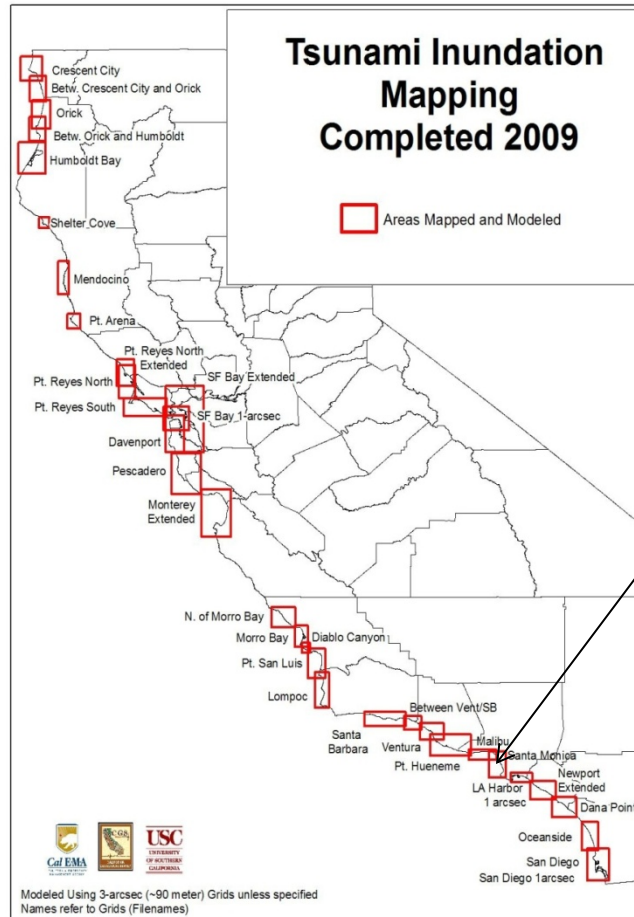
Kevin Miller, California Emergency Management Agency

Eric Boldt, NOAA – National Weather Service

Jeff Terry, Los Angeles Co. EM



- ▶ **Evacuation/Emergency response planning**
- ▶ **Maritime planning**
- ▶ **Land-use planning**



www.tsunami.ca.gov



**THE NATIONAL TSUNAMI
HAZARD MITIGATION
PROGRAM (U.S.)**

Notable Historical Tsunamis in Los Angeles County

Run-up amplitude, in feet, above
normal tide conditions

OBS = observed tsunami activity
NR = No damage or severe
conditions reported

- Distant Source -
Tsunamis without felt
earthquakes

- Local Source -
Earthquake and tsunami
together



THE NATIONAL TSUNAMI
HAZARD MITIGATION
PROGRAM (U.S.)

Date	Magnitude-Source area	Tsunami location	Run-Up/Amp	Remarks
7/10/1855	multiple local Eqs	Santa Monica	?	"...considerable commotion in the water, attended by a strong rushing sound..."
8/13/1868	M8.5 - Chile	LA/San Pedro	2 ft	"...the loading dock was submerged..."
5/10/1877	M8.3 - Chile	LA/San Pedro	6 ft	"...The current was frightfully swift to look at..."
8/10/1879	moderate local EQ	Santa Monica	?	Minor "tidal wave" followed EQ
4/13/1923	M7.2 - Kamchatka	LA/San Pedro	?	"...ships had difficulty holding their lines due to swirling tides..."
8/30/1930	meteotsunami?	Santa Monica	10 ft	One person killed due to high surf; conjecture on tsunami source; possible LS from local M5.2 EQ
4/1/1946	M8.8 - Aleutian Islands	LA/San Pedro	3 ft	Broke ships from moorings
		Long Beach	1 ft	NR
		Catalina	6 ft	Damage to docks
11/4/1952	M9.0 - Kamchatka	Santa Monica	2 ft	NR
		LA/San Pedro	1 ft	Docking ferry problematic
		Long Beach	1 ft	NR
3/9/1957	M8.6 - Aleutian Islands	Santa Monica	2 ft	NR
		LA/San Pedro	1 ft	NR
		Long Beach	1 ft	NR
5/22/1960	M9.5 - Chile	Santa Monica	5 ft	NR
		LA/San Pedro	3 ft	One death (swimmer); \$1M in damages; 800 small craft unmoored, 200 damaged, 40 sunk
		Long Beach	3 ft	Dock damage
		Alamitos Bay	2 ft	NR
		Catalina	2 ft	NR
3/28/1964	M9.2 - Alaska	Santa Monica	3 ft	One boat sunk; \$100k damage at Marina Del Rey
		LA/San Pedro	2 ft	One death to longshoreman by falling object; \$250k in damages; 100 boats unmoored, 6 sunk
		Long Beach	?	\$100k in damages
		Alamitos Bay	2 ft	NR
		Catalina	2 ft	NR
11/29/1975	M7.1 - Hawaii	Catalina	4 ft	Damage to dock and boats
9/29/2009	M8.0 - Samoa	LA/San Pedro	1 ft	NR
2/27/2010	M8.8 - Chile	Santa Monica	2 ft	Minor damage in Marina Del Rey
		LA/San Pedro	1 ft	Minor damage to docks and boats
		Long Beach	?	NR
		Catalina	3 ft	Minor damage to several docks
3/11/2011	M9.0 - Japan	Santa Monica	3 ft	Minor damage in Marina Del Rey
		Redondo B.	2 ft	One dock, five boats damaged; \$15K in damage
		LA/San Pedro	2 ft	Minor damage to boats and docks
		Long Beach	?	Damage to dock and boats
		Catalina	?	Damage to several docks and boats

Tsunami Source Scenario Model Results for Los Angeles County

Near shore tsunami heights (flow depths) for both local and distant source scenarios, in FEET above Mean Sea Level. NOTE: The projections do not include any adjustments for ambient conditions, such as storm surge and tidal fluctuations, and model error (it is very important to note this difference, as those numbers can increase the projected water height during an event).

	TSUNAMI SOURCES	Approximate Travel Time	Leo Corrillo State Beach	Malibu Beach/Lagoon	Santa Monica Pier	Marina Del Rey	Manhattan Beach	Redondo Beach	Palos Verdes Hills	San Pedro-POLA	Long Beach Middle Harbor-POLB	Long Beach	Naples-Alamitos Bay
Local Sources	M7 Newport-Inglewood Fault	10-15min								2	3	3	3
	M7.5 Channel Isl. Thrust Fault	10-15min	4		3	2	3	3	3				
	M7.2 Anacapa Dume Thrust Fault	10-15min		8	6	3	6	6	5				
	Palos Verdes Landslide 1	10-15min			7	4	6	10	20	4	4	4	5
	Palos Verdes Landslide 2	10-15min								6	5	5	5
	M7.1 Santa Monica Thrust Fault	10-15min		4	5	3	3	4	3				
	M7.7 Catalina Fault	15-20min	4	6	6	5	6	6	6	5	7	7	7
Distant Sources	M9 Cascadia-full rupture	2hr			4	4	4	4	3	3	4	4	4
	M9.2 Alaska 1964 EQ	6hr	5	5	7	6	5	4	4	8	7	9	8
	M8.9 Central Aleutians I	6hr	3		5	5	4	4	4	4	5	5	4
	M8.9 Central Aleutians II	6hr			3	4	3	4	3	3	3	4	4
	M9.2 Central Aleutians III	6hr	6	7	10	10	7	6	5	13	10	11	13
	M9 Kamchatka 1952 EQ	9hr	3										
	M8.8 Kuril Islands II	10hr			3	2	3	2	2	2	3	3	3
	M8.8 Kuril Islands III	10hr			3	3	3	3	2	2	3	3	3
	M8.8 Kuril Islands IV	10hr			3	3	3	3	2	2	3	3	3
	M8.8 Japan II	11hr			3	3	3	3	2	2	3	3	3
	M9.5 Chile 1960 EQ	13hr			5	5	4	4	4	4	7	9	10
	M9.4 Chile North	13hr	5	5	5	6	5	5	5	4	10	9	11
Maximum Runup - Local Source			4	9	8	5	7	11	24	7	8	8	8
Maximum Runup - Distant Source			7	9	11	11	8	7	5	15	12	13	15



THE NATIONAL TSUNAMI
HAZARD MITIGATION
PROGRAM (U.S.)

2011 Tohoku Tsunami in California

- Large tidal fluctuations = 16 feet in Crescent City (largest surges at low tide)
- Strong currents/debris in harbors
- Potential dangerous tsunami conditions lasted for more than 24 hours, especially in SoCal
- Impacts: one fatality; two dozen harbors damaged; Official = \$50M; Total ~\$100M
- Recovery of harbors taking years



*March 11, 2011 Tohoku Tsunami in California;
video from back part of Santa Cruz Harbor,
hours after first wave arrival*

Lessons Learned from Recent Tsunamis in California

■ Evacuation Issues

- Inconsistent evacuation/response statewide
- How can tides be incorporated/considered?
- NTCW information highly accurate and time available to respond but evacuation options are all or nothing: What to do in a minor “Warning” level alert?

■ Maritime Community Issues

- Inconsistent response activities: If/When/Where to reposition boats?
- Educate boat owners about tsunami hazards to help them make better decisions
- Ongoing recovery issues: What can be done to improve tsunami resistance and resiliency in harbors?

- **Potential Solutions** Response playbooks for various size events that improve real-time decisions/response options

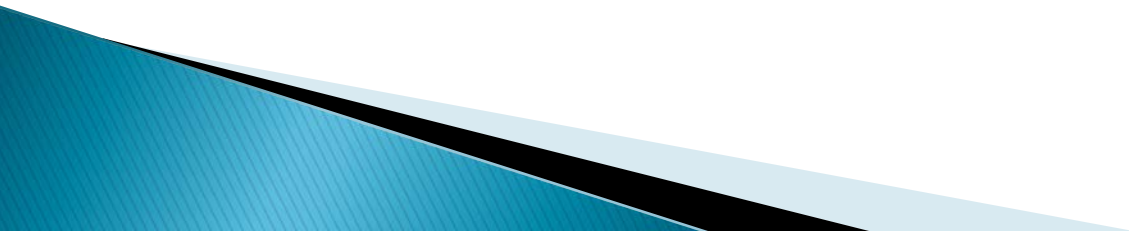


March 2011: Post tsunami; Boats sunk; recovery efforts in Crescent City Harbor



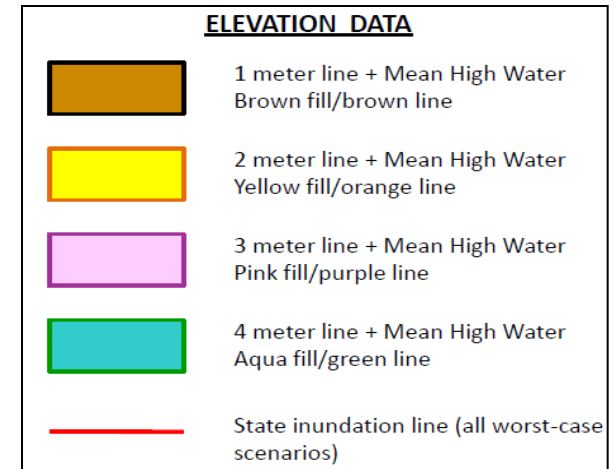
March 2014: Rebuild in “tsunami resistant” Crescent City Harbor

Tsunami Evacuation Playbooks and FASTER tsunami height calculation



Evacuation Playbooks for Scenario Tsunami Events

- Tsunami scenario playbooks based on:
 - Smaller distant-source events with time to prepare secondary/smaller evacuation; like March 11, 2011 event (more than 6 hours to prepare)
 - Local or distant-source events with little time to prepare (less than 6 hours)
- First products - Lines of elevation (1m to 4m) at Mean High Water show potential flood areas – available summer/fall 2013
- Can be used for planning scenarios and partial or secondary evacuations
- Guidance for use, consideration of FA-S-T-E-R decision-making approach



Evacuation response planning “playbooks” (less than “worst-case” scenarios)

Working example: Formula for determining
playbook evacuation line to use (FA-S-T-E-R):

FA: Forecasted Amplitude (Wave Height) from
Warning Center

+

S: Storm surge or existing ocean conditions

+

T: Maximum tidal height (first 5 hours of tsunami)

+

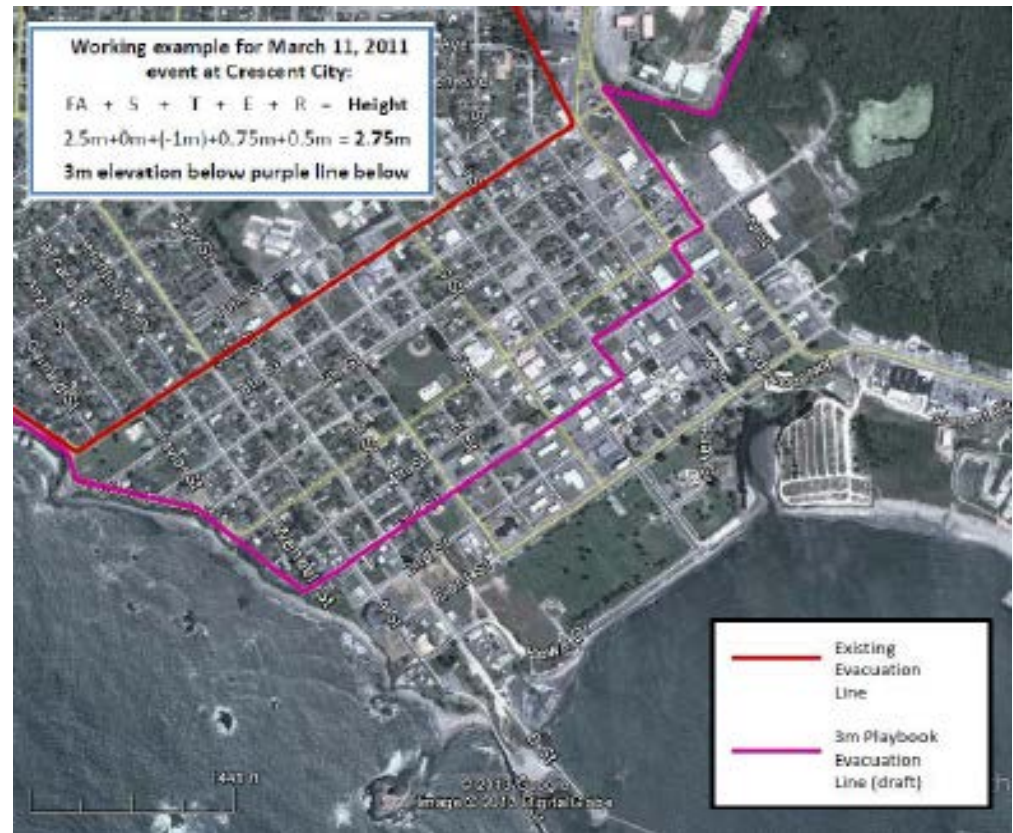
E: Forecast error potential (30%; analysis of 2010-11 events)

+

R: Site amplified run-up potential (from existing modeling,
unique to each location; applied if inundation expected)

= Maximum tsunami run-up height

= Playbook elevation line



Scenario evacuation playbooks – Crescent
City (California Tsunami Program)

Locations for Tsunami Arrival Time/Amplitude

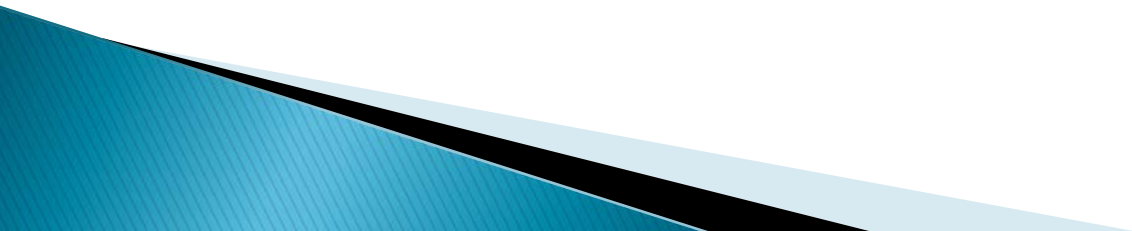
Requested by counties to make sure information is consistent coming from National TWC in future events.

We've chosen several locations within each county; more locations picked if coast is long, highly populated, or multiple tide gauges exist.



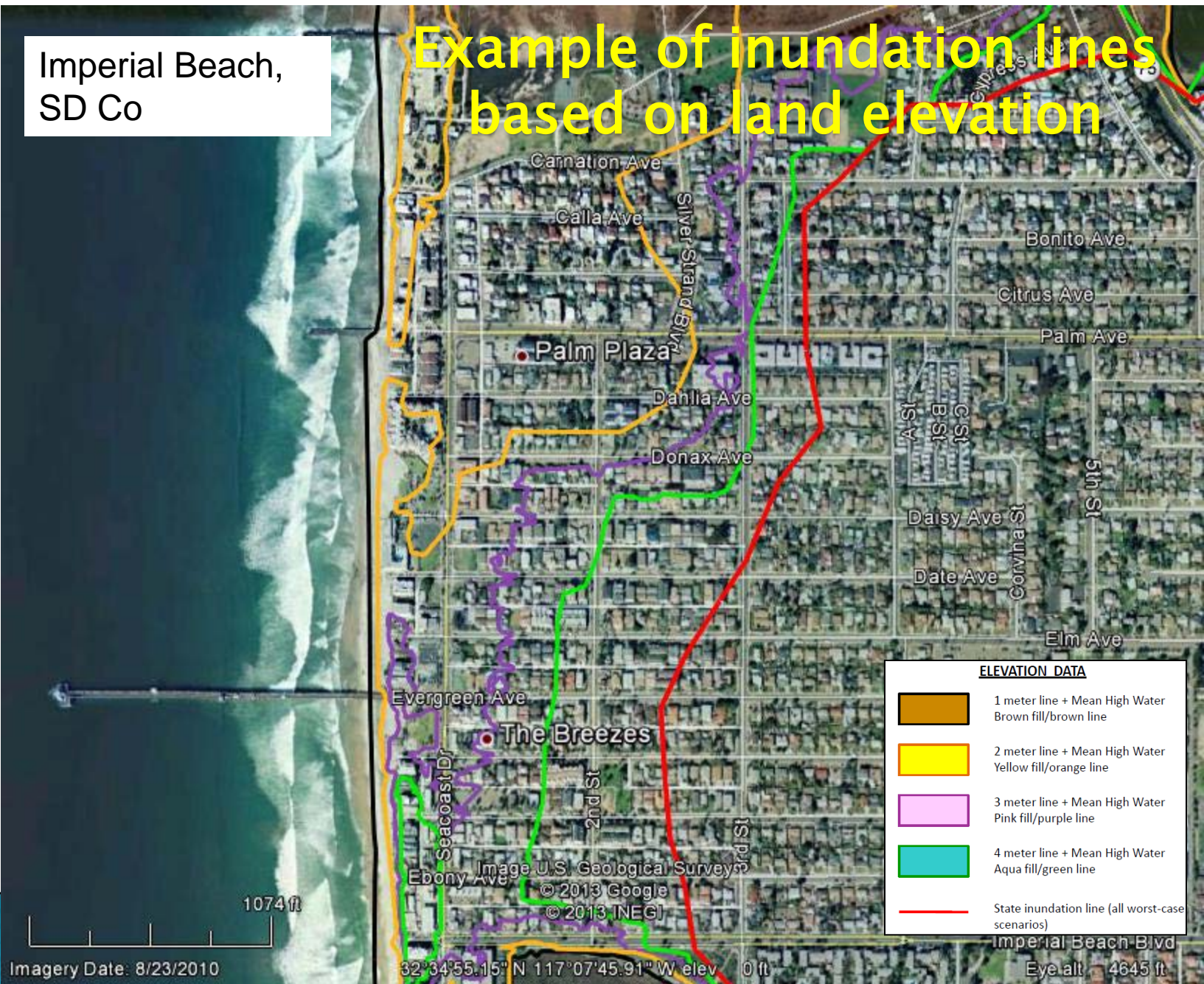
Spreadsheet for FASTER calculation in Los Angeles County

**Example of how playbook
evacuation line is produced from
playbook inundation lines**



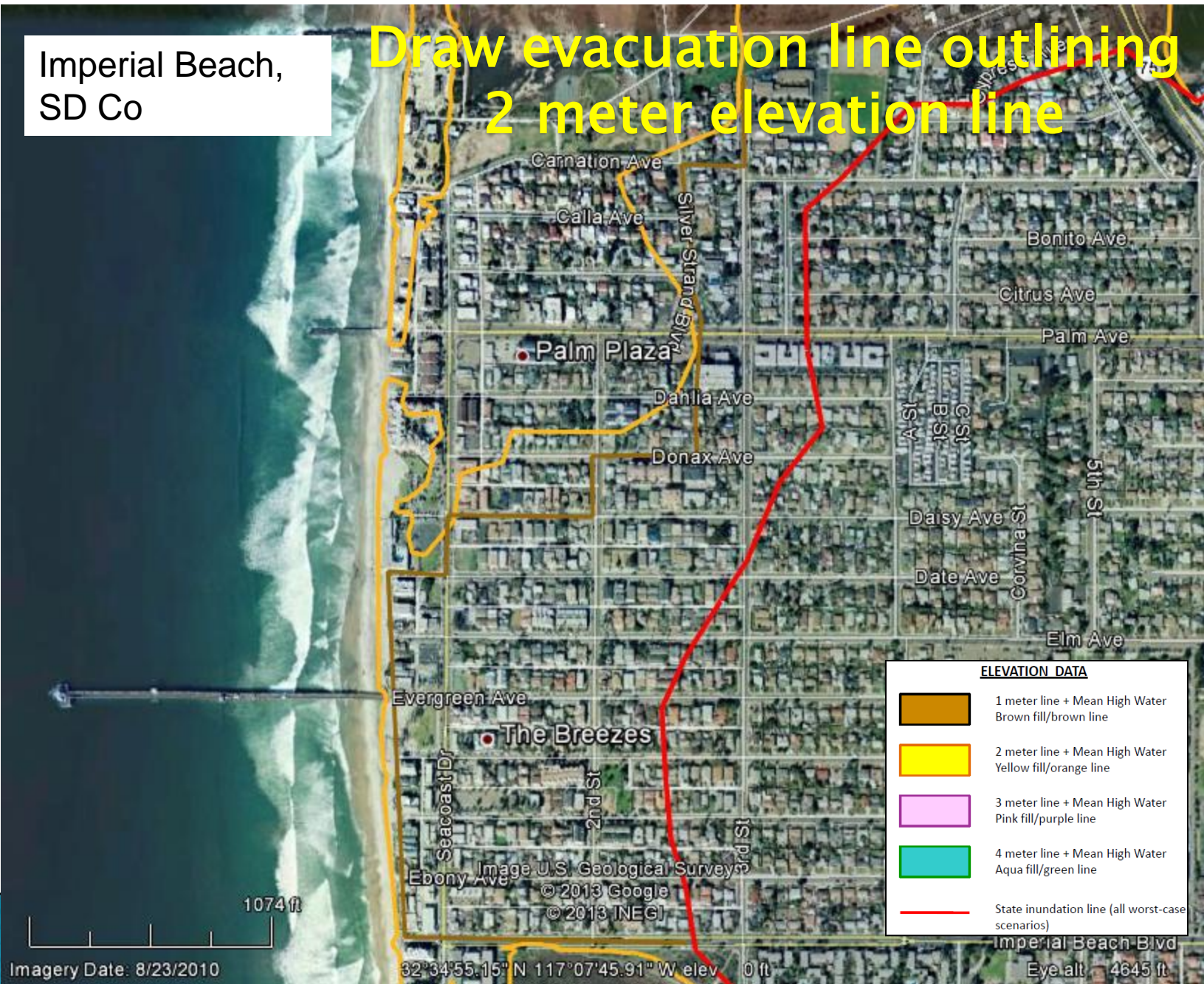
Imperial Beach,
SD Co

Example of inundation lines based on land elevation



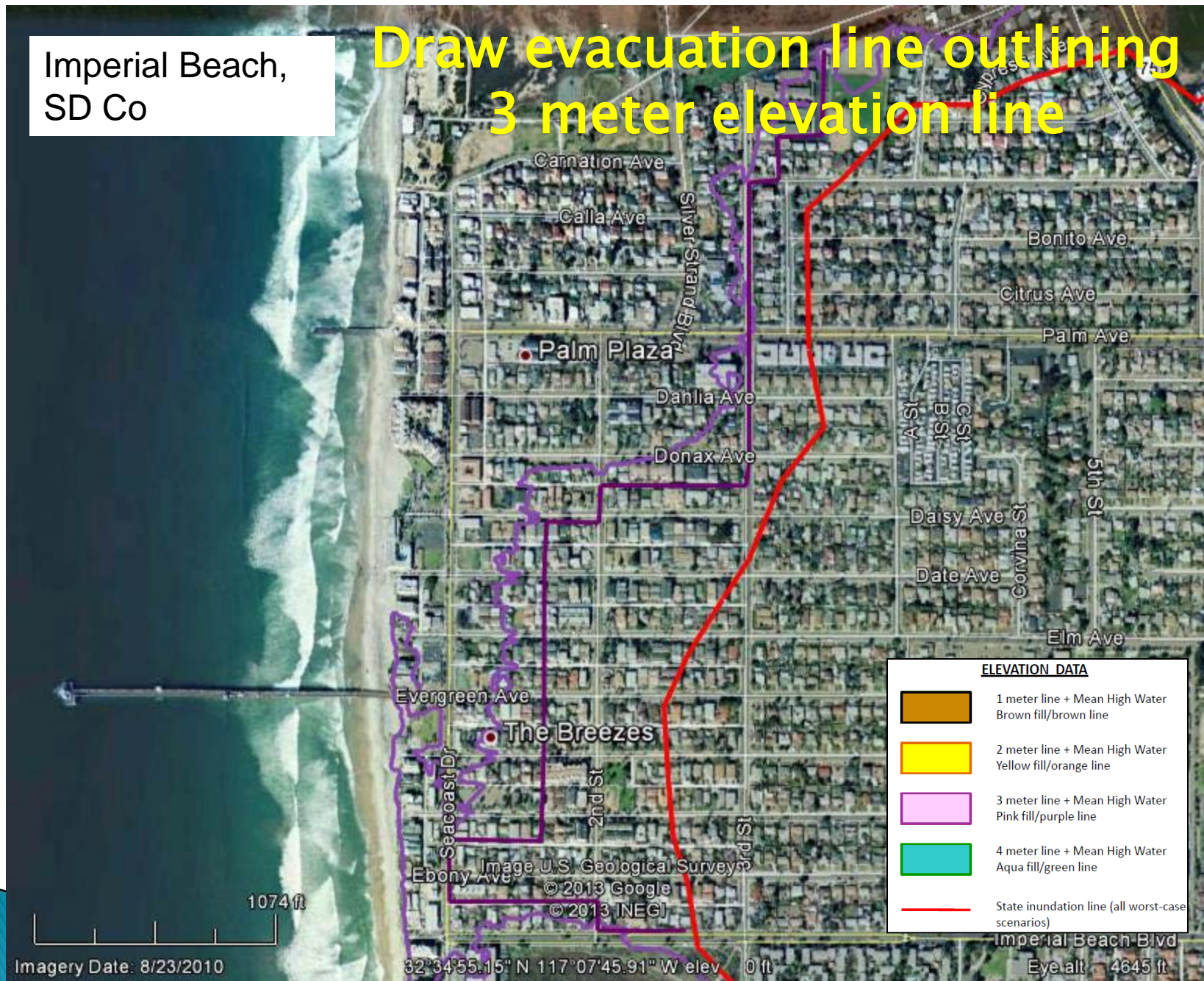
Imperial Beach,
SD Co

Draw evacuation line outlining 2 meter elevation line



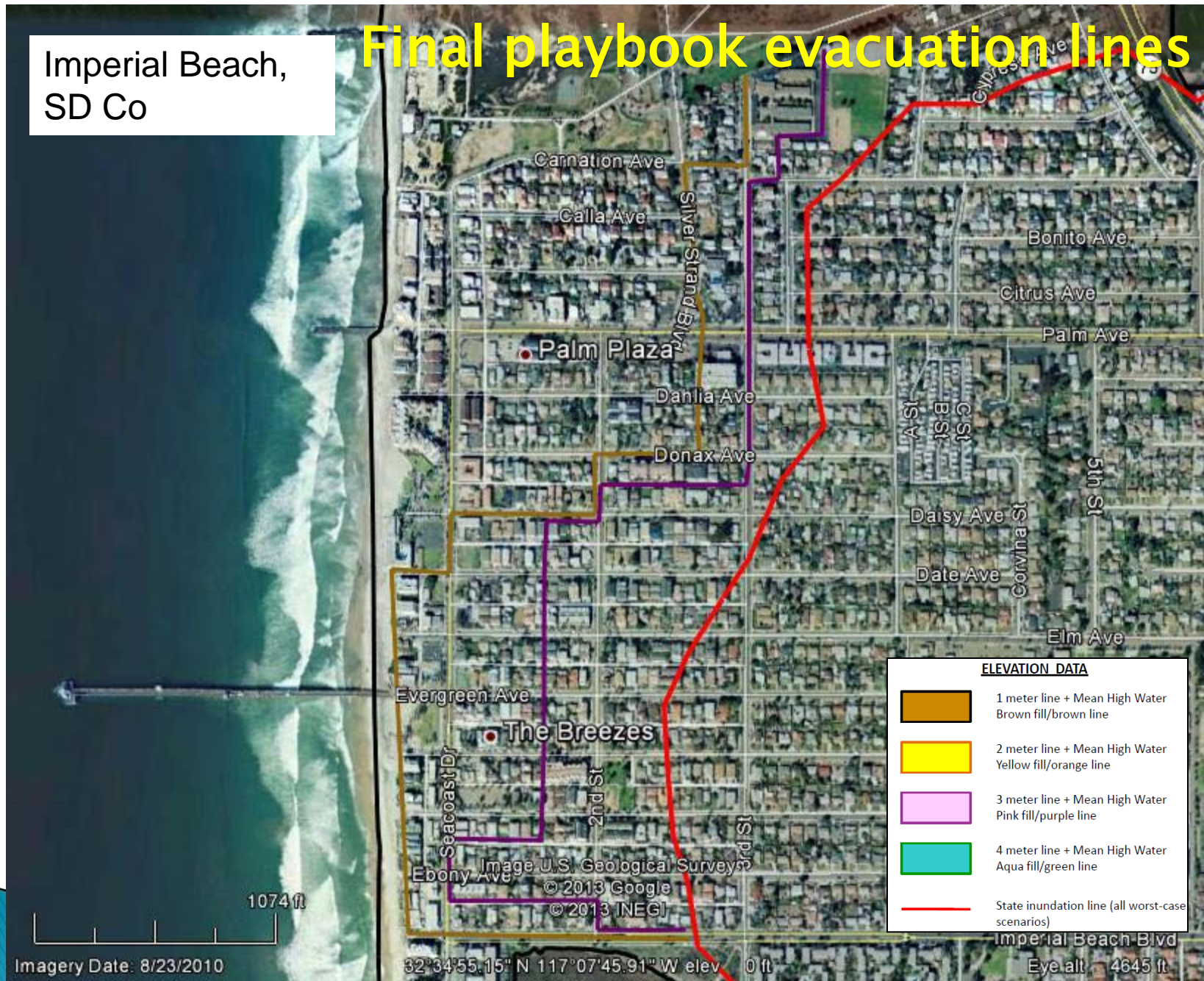
Imperial Beach,
SD Co

Draw evacuation line outlining 3 meter elevation line



Imperial Beach,
SD Co

Final playbook evacuation lines





DRAFT - Tsunami Evacuation Playbook

Long Beach, Los Angeles County

Purpose and Use of this Tsunami Playbook

PURPOSE: NOTE: Emergency managers should become familiar with this Playbook plan prior to use. A significant issue for emergency managers is that existing tsunami evacuation plans call for evacuation of the predetermined tsunami evacuation zone (typically at a 30- to 50-foot elevation) during a “Warning” level event; the alternative is to not call an evacuation at all. A solution to provide more detailed information has been the development of tsunami evacuation “Playbooks” to plan for tsunami scenarios of various sizes and source locations. NOAA-issued Tsunami Alert Bulletins received in advance of a distant event will contain a tsunami alert level, forecasted tsunami amplitude (or wave height) and arrival time for a number of locations along the coastline. Elevation “playbook” evacuation lines can be useful for partial tsunami evacuations when information about forecasted tsunami amplitudes and arrival times is available to coastal communities and there is sufficient time to implement a partial evacuation. Provision for multiple elevation evacuation lines and response plans for those lines enables planning for different evacuation scenarios based on the forecast tsunami amplitude, potentially alleviating the need for an “all or nothing” decision with regard to evacuation.

USE: This playbook is designed to help the emergency managers with tsunami evacuation and response activities. First, it requires that the emergency manager become familiar with the information herein, especially the “Tsunami Response Decision Tree” (Page 2), the overall Playbook approach, and FASTER calculation (Page 3). When a distant-source tsunami is occurring, fill out the information on Page 2 regarding the earthquake (magnitude, location) and tsunami (alert level, forecasted amplitude and arrival time). Keep in mind that this information can change during the first hour or two after the earthquake occurs.

Use this information to determine which branch of the decision tree applies to the event. Refer to information on Page 3 regarding the “Elevation Evacuation Playbook,” the “Scenario Evacuation Playbook,” and the FASTER calculation value. FASTER will be calculated and provided to each community by the county or regional Weather Forecast Office. Each scenario Playbook will be accompanied by a digital file identifying the full evacuation zone for a community. This file should be referenced and used during an event. Communities may wish to use these maps to establish “reverse 911” calling areas.

Table of Contents – Tsunami Response Plan Playbooks

Page 1: Purpose and use evacuation playbooks, tsunami alert bulletins
Page 2: Real-time quick reference page and “decision tree” for response
Page 3: Real-time evacuation playbook reference page and FASTER explanation
Pages 4-7: Tsunami elevation evacuation scenario playbook plans pages
Page 8: Notable historical tsunamis and state tsunami program modeling results

Tsunami Alert Bulletins: During the typical tsunami alert, the Warning Center provides information about the tsunami in “bulletins” to the state and local jurisdictions. There are four levels of “alert” that can be sent by the NTWC (from least to greatest significance):

Tsunami Information Statement - Issued to inform and update emergency managers and the public that an earthquake has occurred, or that a tsunami Watch, Advisory or Warning has been issued elsewhere in the ocean.

Tsunami Watch - Issued to alert emergency managers and the public of an event which may later impact the Watch area. May be upgraded to an Advisory or Warning - or canceled - based on updated information and analysis.

Tsunami Advisory - Issued due to the threat of a tsunami which may produce strong currents or waves dangerous to those in or near the water; typically called when forecasted tsunami amplitudes are between 0.3m and 1m (1ft and 3ft) above existing tidal conditions are expected. Coastal communities are advised that beach and harbor areas could expect rapid, moderate tidal changes and strong currents.

Tsunami Warning - Issued when a tsunami with significant widespread inundation is imminent or expected; typically called when forecasted tsunami amplitudes are equal to or greater than 1m (3ft). Coastal communities are advised to evacuate people from low-lying areas identified as vulnerable to tsunamis.

Quick Reference Page for Determining Real-Time Tsunami Response Activities

NOTE: It is important to review all sections of this Playbook prior to using it during a tsunami emergency. When a Tsunami Alert is issued, fill out the Quick Reference page below under Step 1 and follow steps on the right side of the page to determine response activities:

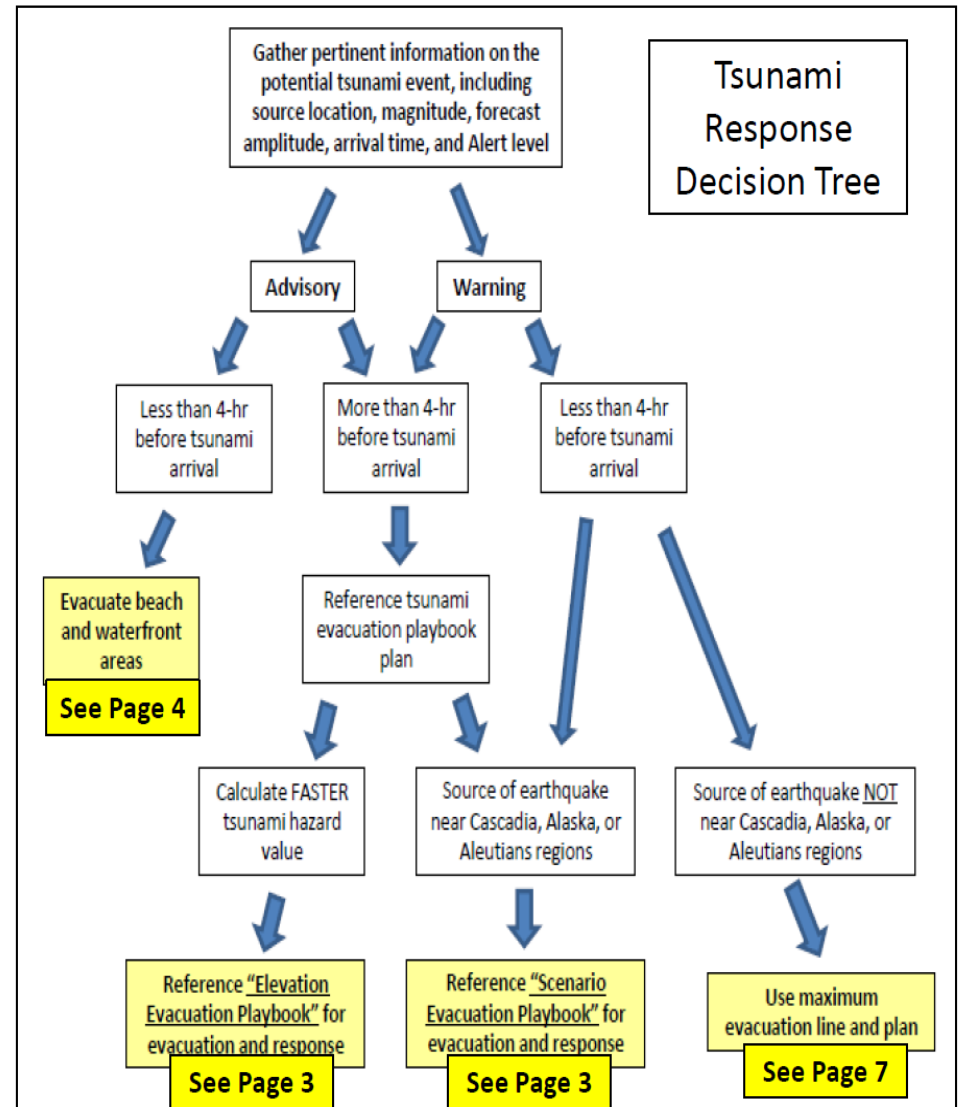
Step 1: Obtain information about earthquake and tsunami from National Tsunami Warning Center in Alaska, regional NOAA-Weather Forecast Office, and/or county emergency manager. The explanation of the FASTER calculation is provided on Page 3. The FASTER value is used to determine which Playbook scenario to use.

Earthquake location _____
 Earthquake magnitude _____
 Tsunami Alert level _____
 Forecasted tsunami amplitude/wave height _____
 Forecasted tsunami arrival time _____
 Highest projected tidal height (above Mean Sea Level) for first 5 hrs after arrival _____
 Ambient ocean/storm conditions for first 5 hrs after arrival: _____
 Calculate/obtain FASTER tsunami run-up value in first 5 hours: _____
 Calculate/obtain FASTER tsunami run-up value at highest tide _____

Step 2: Compare the information from Step 1 to the Tsunami Response Decision Tree on the right. Select the decision tree branch that best fits the forecast tsunami information.

Step 3: Go to Page 3 “Playbook reference” page and utilize the appropriate Playbook or strategy for evacuation and response.

A set of digital evacuation maps and response instructions will accompany each of the Elevation Evacuation Playbook scenarios. These files can be used to develop “reverse 911” calling areas prior to the event.



Real-time Playbook Evacuation and FASTER Calculation Reference Page

FASTER Analytical Tool: To determine the full impact of the tsunami, other variables such as tidal and storm conditions must be considered. An analytical method has been created which incorporates important variables that will impact the ultimate tsunami flood level. The FASTER calculation, which will be provided to communities by the county or regional NWS Weather Forecast Office during a tsunami event, is used to help determine if inundation of dry land will occur. Communities can use the FASTER value to match which evacuation “playbook” to use. The simplified components of the calculation are as follows:

**Working example: Formula for determining
playbook evacuation line to use (FA-S-T-E-R):**

FA: Forecasted Amplitude (Wave Height) from
Warning Center

+

S: Storm surge or existing ocean conditions

+

T: Maximum tidal height (first 5 hours of tsunami)

+

E: Forecast error potential (30%; analysis of 2010-11 events)

+

R: Site amplified run-up potential (from existing modeling,
unique to each location; applied if inundation expected)

= Maximum tsunami run-up height
= Playbook elevation line

Elevation Evacuation Playbook: The table below can be used to select the appropriate elevation evacuation playbook response plan. Once the FASTER value is obtained, it should be compared to the appropriate playbook reference page for evacuation and response activities.

Reference Pages for Detailed Evacuation and Response Information	Community Evacuation Name for Playbook Evacuation Zones	Recommended FASTER Expected Flood Level Value (METERS)	Recommended FASTER Expected Flood Level Value (FEET)	Anticipated NOAA Tsunami Alert Level	Community recommended areas to evacuate (local decision)
Page 4	Phase 1	less than 1.00m	less than 3.3ft	Advisory	beaches, docks, waterfront areas
Page 5	Phase 2	1.00m to 1.50m	3.3ft to 5.0ft	Warning	Stage1/Phase 1 and low-lying areas prone to normal flooding
Page 6	Phase 3	1.50m to 2.50m	5.0ft to 8.2ft	Warning	Areas mapped as Stage 3 (if applicable)
Page 7	Maximum Phase (as recommended by existing NOAA protocol)	more than 2.50m	more than 8.2ft	Warning	Evacuate to maximum evacuation zone

Scenario Evacuation Playbook: Scenario tsunami playbooks and guidance have been developed for maximum local and distant tsunamis, and for tsunamis coming from the Cascadia subduction zone toward central and southern California. Scenario playbook information about the expected tsunami amplitude and travel time is available from the numerical modeling results for these sources. These are important scenarios for emergency managers to prepare for as there could only be tens of minutes to evacuate or just a few hours to conduct response or evacuation activities before the tsunami arrives. Because of the short time for making response decisions, the following evacuation and response plans are recommended for all of Los Angeles County:

Scenarios with short tsunami arrival times	Shortest tsunami travel time to San Diego County after earthquake	Suggested Scenerio Playbook Response Plan
Local coastal earthquake >M6.5	10-15 minutes	Maximum evacuation zone
Cascadia subduction zone >M8.5	2 hours	Level/State/Phase 3 Elevation Playbook
Alaska or Aleutians subduction zone >M8.5	6 hours	Maximum evacuation zone

Reference Pages for Detailed Evacuation and Response Information	Community Evacuation Name for Playbook Evacuation Zones	Recommended FASTER Expected Flood Level Value (METERS)	Recommended FASTER Expected Flood Level Value (FEET)	Anticipated NOAA Tsunami Alert Level	Community recommended areas to evacuate (local decision)
Page 4	Phase 1	less than 1.00m	less than 3.3ft	Advisory	beaches, docks, waterfront areas
Page 5	Phase 2	1.00m to 1.50m	3.3ft to 5.0ft	Warning	Stage1/Phase 1 and low-lying areas prone to normal flooding
Page 6	Phase 3	1.50m to 2.50m	5.0ft to 8.2ft	Warning	Areas mapped as Stage 3 (if applicable)
Page 7	Maximum Phase (as recommended by existing NOAA protocol)	more than 2.50m	more than 8.2ft	Warning	Evacuate to maximum evacuation zone

Phase 1 Evacuation Plan

Background Information:

Alert level = Advisory

FASTER tsunami value = less than 1.0m (3.3 ft)

Specific Instructions:

- Follow general guidance for Advisory-level tsunamis (Page 1)
- Evacuate beaches, piers, and harbor docks and boats. Strong currents and potential scour may be expected in harbors.
- A digital file showing evacuation maps and response instructions is available for use.
- Specific evacuation and response instructions.....
(completed with the community input)



Phase 2 Evacuation Plan

Background Information:

Alert level = Warning

FASTER tsunami value = between 1.0m (3.3 ft) and 1.5m (5.0ft)

Specific Instructions:

- Follow general guidance for Warning-level tsunamis (Page 1)
- Evacuate areas outlined by the black line, including beaches, piers, and harbor docks and boats. Strong currents and potential scour may be expected in harbors.
- A digital file showing evacuation maps and response instructions is available for use.
- Specific evacuation and response instructions.....
(completed with the community input)



Phase 3 Evacuation Plan

Background Information:

Alert level = Warning

FASTER tsunami value = between 1.5m (5.0ft) and 2.5m (8.2ft)

Specific Instructions:

- Follow general guidance for Warning-level tsunamis (Page 1)
- Evacuate areas outlined by the gold line, including beaches, piers, and harbor docks and boats. Strong currents and potential scour may be expected in harbors.
- A digital file showing evacuation maps and response instructions is available for use.
- Specific evacuation and response instructions.....
(completed with the community input)



Maximum Phase Evacuation

Background Information:

Alert level = Warning

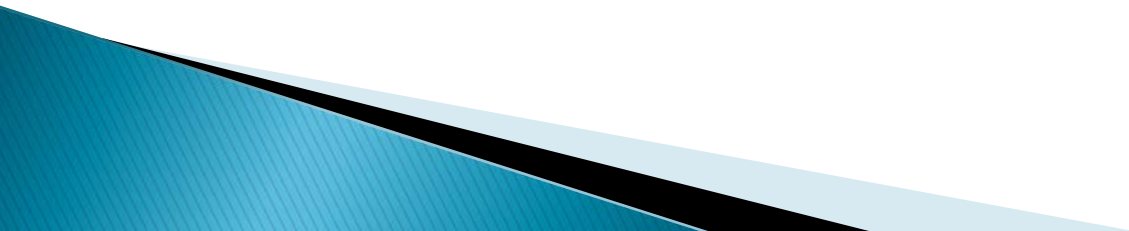
FASTER tsunami value = greater than 2.5m (8.2ft)

Specific Instructions:

- Follow general guidance for Warning-level tsunamis (Page 1)
- Evacuate areas outlined by the red line (the maximum tsunami evacuation zone), including beaches, piers, and harbor docks and boats. Strong currents and potential scour may be expected in harbors.
- A digital file showing evacuation maps and response instructions is available for use.
- Specific evacuation and response instructions.....
(completed with the community input)



Maritime Products (Playbook)





FEMA



DRAFT - Tsunami Response Plan Playbook South POLA Maritime Communities

Purpose and Use of this Real-time Tsunami Response Plan Playbook

PURPOSE: This product will help the harbor prepare, plan, and respond to strong currents and damage from future tsunamis. It has been developed with assistance from the harbor by the California Tsunami Program and funding from FEMA. It is essential that harbor staff become familiar with the playbook before use. The information within the playbook can also help the harbor develop tsunami mitigation strategies (other guidance is available for this).

USE: This playbook is designed to help the harbor with tsunami response activities by providing enhanced info about the tsunami based on specific inputs for the harbor.

First, it requires that the harbor fill out information about their harbor (see “Background information” on Page 2, and Playbook information on Pages 6-10); this should be done when the Playbook is first received. The California Tsunami Program will work with the harbor to get this information.

When a tsunami is occurring, follow the steps outlined on Page 2. The harbor master or emergency response manager should fill out information about the source earthquake and tsunami on Page 2; this information can be obtained from multiple sources, including the tsunami alert message from the National Tsunami Warning Center, the city or county emergency manager, and/or the National Weather Service, Regional Weather Forecast Office. Keep in mind that this information can change during the first hour or two after the earthquake occurs.

Finally, compare the tsunami forecast amplitude (wave height) to the maximum tsunami amplitude on the scenario table on Page 3. Choose the scenario (Pages 6-10) which best matches the forecast information. Follow the instructions on the page for that scenario. Each scenario Playbook may be accompanied by a digital file indicating the response and evacuation plans; this can be shared during an emergency with emergency responders in the field.

Quick Reference Page for Determining Real-Time Tsunami Response Activities

NOTE: It is important to review all sections of this Playbook prior to using it during a tsunami emergency. When a Tsunami Alert is issued, fill out the Quick Reference page below and follow steps on the right side of the page to determine response activities for the harbor:

Step 1: Obtain information about earthquake and tsunami from National Tsunami Warning Center in Alaska, regional NOAA-Weather Forecast Office, and/or county emergency manager. (e.g. www.tsunami.gov)

Event/Incident Name _____

Earthquake location _____

Earthquake magnitude _____

Tsunami Alert level _____

Forecasted tsunami amplitude/wave height (will be compared to Peak Amplitude in Step 2) _____

Forecasted tsunami arrival time _____

Highest projected tidal height (above Mean Sea Level) for first 5 hrs after arrival _____

Ambient ocean/storm conditions for first 5 hrs after arrival _____

Calculate/obtain FASTER tsunami run-up value in first 5 hours (see Page 2 for FASTER approach) _____

Calculate/obtain FASTER tsunami run-up value at highest tide (see Page 2 for FASTER approach) _____

Step 2: Compare and match forecasted tsunami amplitude/wave height in Step 1 to "Peak Amplitude" in the table. Refer to associated Playbook page to determine actions for securing vessels and repositioning ships away from areas of expected damage to safe areas within the harbor or offshore (Pg. 11) (modeled data in parentheses).

Reference Pages for Details in Maritime Playbook	Past Events and Modeled Scenarios	Alert Level	Earthquake Magnitude	Source Location	Peak Amp. (in meters, at tide gauge)	Tidal condition (first 5hrs)	Peak Velocity from Modeling (in knots)	Damage Summary	Damage Index (USC)
	2005	Advisory	8.0	Samoa	0.13	High	>3	No currents or damage	0
Page 6	2011	Advisory	9.0	Japan	0.49	Low	6	Minor damage to docks and boats	2
Page 7	Modeled Scenario #1	(Advisory-Warning)	(9.0)	(Cascadia)	(0.4)	High	(6)		
Page 8	2010	Advisory	8.8	Chile	0.42	Low	7	Minor damage to docks and boats	2
Page 9	Modeled Scenario #2	(Warning)	(9.4)	(Chile)	(1.0)	High	(9)		
Page 10	Modeled Scenario #3	(Warning)	(9.2)	(Aleutians)	(1.2)	High	(>10)		

Step 3: Infrastructure considerations:

Will the tsunami overtop harbor pilings? (compare FASTER run-up value to lowest pile height)

Will the tsunami inundate dry land? (compare FASTER run-up value to lowest land elevation)

STEP 1: Collect general tsunami information, used with table in Step 2 to determine appropriate actions to follow:

- 1) Earthquake location and magnitude.
- 2) Tsunami Alert level.
- 3) Forecast amplitude and arrival time provided by Warning Center.
- 4) Tidal and storm conditions provided by local Weather Forecast Office.
- 5) "FASTER" calculation, provided by WFO or county.

STEP 2: Chose the scenario/event from the table that best matches tsunami information in Step 1:

- 1) Compare forecast amplitude/wave height from real event in Step 1 to peak amplitude column from historical events/ scenarios on table (highlighted in red box at left).
- 2) Find matching scenario in "playbook."
- 3) Go to appropriate playbook page and follow instructions for response.
- 4) Each Playbook scenario may have digital maps or information available for sharing with people in the field or other offices.

STEP 3: Estimate of potential inundation of land and

overtopping of piles: Helps estimate the potential and amount of inundation, and if piles will be overtopped. Land evacuation should be coordinated with city or county emergency manager.

M9.2 Eastern Aleutian-Alaska Scenario

Background Information:

Alert level = Warning

Peak Amplitude = 1.2 meters (modeled)

Peak Velocity = +10 knots

Projected duration of strong currents (see location maps below):

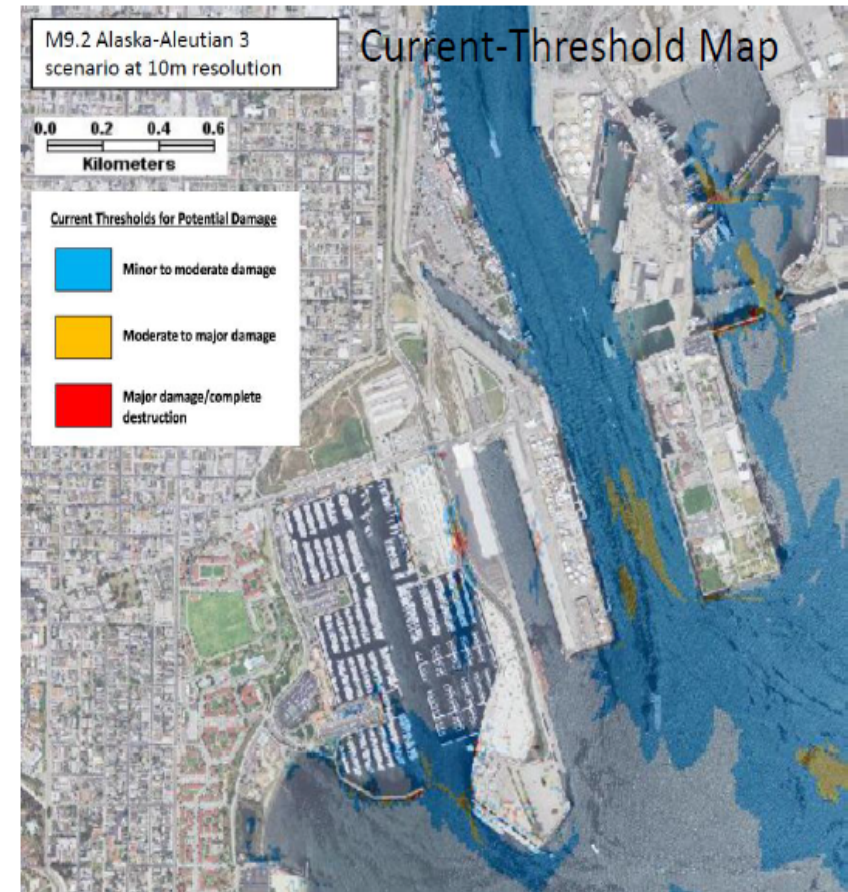
3-6 knots = 30 hrs; 6-9 knots = 10 hrs; >9 knots = 0 hrs

Specific Instructions:

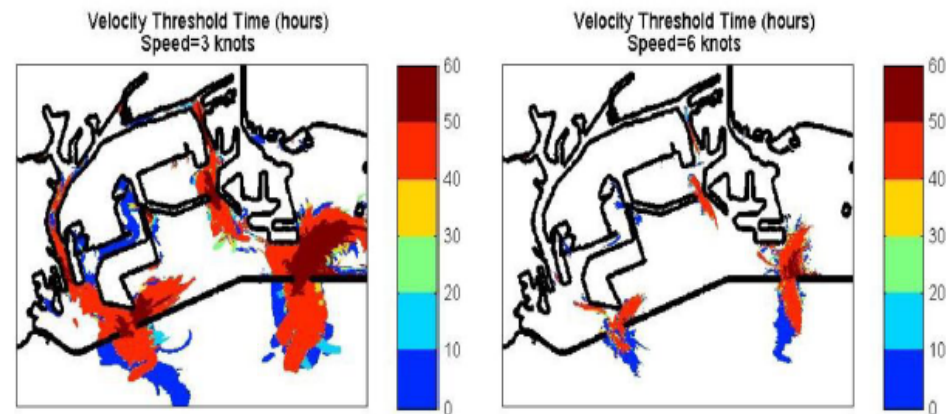
- Follow general guidance for Warning-level tsunamis (Page 5)
- Strong currents and potential scour are expected in areas identified in blue – yellow-red on the map to the right. Consider relocating vessels located within 100 meters (300 feet) of these areas.
- Specific areas where vessels should be relocated from and docks secured:
 - NONE (completed with maritime community input)

Safe areas for repositioning vessels within South POLA:

(completed with maritime community input)



Map of areas of potential sedimentation, debris accumulation, and extreme shallow conditions (keel damage)



Suggested Completion Schedule for Los Angeles County Products – We need your help!

- **Evacuation playbooks**

- April – Communities - Feedback on Long Beach draft
- May – State - Completion of draft playbook evacuation lines for LA Co
- July – Communities - Feedback on lines and finalize maps
- August – Communities - Complete evacuation plan pages and integrate into Tsunami Annex (?)

- **Maritime response playbooks**

- April – Maritime Communities - Feedback on south POLA draft
 - July – State - Completion of draft playbooks for all of LA Co
 - September – Maritime Communities - Complete response plan pages
 - November – Communities – Consider updating Local Hazard Mitigation Plans
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